10/524883

DT05 Rec'd PCT/PTO 16 FEB 2005

STACKING MACHINE OF FOLDED CARDBOARD BOXES OR SHEETS

DESCRIPTION

OBJECT OF THE INVENTION

The present invention relates to a stacking machine of folded cardboard boxes or sheets the clear purpose of which is to form stacks or packages of both cardboard sheets intended for the conformation of boxes, and of sheets previously transformed and turned into folded boxes. The machine is foreseen for mounting in a line or following a line for transformation of the cardboard sheets, to form stacks of folded boxes obtained in the transformation line, wherein each stack or package is obtained by means of two halves which are obtained in different areas of the actual machine, starting from the entrance thereto, so that the two halves or semi-packages are superimposed and form the package or stack which is subsequently conveyed to the exterior of the machine.

BACKGROUND OF THE INVENTION

In the industry of transformation of corrugated cardboard, are to be found the so-called flexo-folder-gluer lines for the production of boxes, so that in this type of line rectangular sheets of corrugated cardboard are inserted and at the end of the line packages are obtained of different numbers of boxes stacked on top of each other, it being possible to vary the height of packages between limits which are generally between 50 and 350 mm.

The lines in which transformation of the cardboard sheets is carried out comprise different modules which carry out well differentiated functions, and which are:

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EV343684155US

- An inserter which serves to feed the line sheet by sheet in the required sequence.
- Printers which serve to print the sheets with ink.
- A slotter, which serves to cut the slots and mark the grooves.
- A s press which carries out irregular cuts, although this module is optional.
- A folder which serves to glue and fold the panels of the box.
- A stacker which carries out the stacking in packages starting from the folded boxes.

All the manufacturers of flexo-folder-gluer lines use a stacker at the end of their lines, the basic functions of which are the following:

- To align the boxes that come from the folder and which are usually slightly misaligned.
- To carry out the separation between the last box of one package and the first box of the following one, an important stage because the speed at which the boxes can be fed in is usually high, whilst the spacing between boxes is small.
- To stack the boxes in piles without said boxes coming from the folder being allowed to open; that is, to prevent the boxes unfolding during the stacking and possibly originating jamming in the operation of the stacker.
- To extract the packages or stacks of boxes.

The stackers can carry out the stacking in the lower part, that is to say, the box enters the stack on the underside, it being equally possible to carry out the stacking on the topside, in which case the box enters the stack by the top part.

In the European Patent number 666.234 of the French Company

S.A. MARTIN, a stacking station is described with separation and evacuation of batches of sheet elements stacking being at the output of a machine for transformation of such elements, wherein the station stacks the folded and flattened cardboard boxes in the lower area thereof, comprising some means of admission of the sheet elements, these falling onto a stack which is formed on a table lift which descends as the stack builds up, the top part of the table being formed by rollers or endless belts, also comprising some spacing arms joined to a mobile horizontal tie which is displaced parallel and perpendicularly to the plane of the table, the spacers being positioned to receive the sheet elements. It also comprises an output conveyor, to the level of which the table descends for removal of the lot or package of sheet elements.

In the European Patent number 6771 of this same French company, a procedure or device is described for the stacking of sheets, based on a system of conveyor belts which displace the cardboard boxes and deposit them in a stack with a base which is moveable in height, so that when a certain height is reached, the stacker interrupts the loading of boxes into the stack.

Likewise, in the European patent number 578.990 of the same French company, an element is described for retaining sheets or boards for the storage of the pile, said retaining element being formed from flexible rods displaceable by pistons or cylinders to retain the sheets of the cardboard boxes when these are stacked.

In the European Patent number 529.708 of the firm WARD HOLDING COMPANY INC., a machine is described which has means for displacing each sheet at the entrance through the upper area, having rotating flexible cams by means of which the folded boxes are compacted

and flattened, and inserted inside until reaching a stop. In this machine, and after the aforesaid operations, the folded boxes are then lowered into a stacking area and, when the stack has reached a certain height, the whole assembly or package is displaced by the action of some rollers.

The Spanish patents with numbers 512.711, 523.290, 523.291 and 523.292 which have priority over the USA patent nº 4500243, describe some improvements in machines or devices to feed successively synchronized sheets, being based on a feeder of corrugated cardboard sheets, synchronized with other adjacent machines, using negative atmospheric pressure to hold each sheet against the conveyor means constituted by straps, all this with no need for valves and without interrupting the suction pressure. Also, in those Spanish patents a feeding mechanism is described, with stop and omit features, which allows the feeding of sheets in alternate cycles and by selective stoppage.

In the USA patent nº 5,980,196 a counter-ejector is described for boxes which are fed into a machine, in which means are established for the stacking of folded cardboard boxes, and which means have pressure elements which maintain the box folded during the displacement of the same over the conveyor belts, from the entrance area to the stacking area. In this US patent some fingers are likewise described which are introduced, always at a determined height, between the boxes, dividing the stacked package so that, at the output of the machine, the package has a height selected by the actual bottom area of the fingers, so that the stacked boxes resting on those fingers constitute what will be the following package.

DESCRIPTION OF THE INVENTION

The machine which is disclosed has as one of its fundamental characteristics, that the stacking of the folded boxes is performed in two halves which are obtained in different areas, a first lower area and a second upper area, both halves being combined by superimposing to form the desired package or stack.

More specifically, the machine of the invention comprises a tilting table foreseen at the entrance for receiving the folded boxes individually, that table being connected to an arm actuated by servo-motor to carry out the subsequent tilting of the former, so that if said tilting is downward, the folded boxes have access to a first stacking area forming the first half of the package or stack, whilst if the tilting of that tilting table is upward, then the folded boxes are led by means of an upper conveyor belt toward the second stacking area.

The second stacking area will receive the folded boxes, forming the second half of the package, which will be joined with the first half by superimposing on the latter.

The tilting table is formed by some conveyor straps mounted between rollers which are driven through a motor reduction gear.

The infeed of the folded boxes into the first stacking area is carried out with the help of some vanes to guarantee that the folded boxes which are fed in do not collide with the previous box, instead of by blowing with air, avoiding the upsetting of the boxes and the ensuing jams. Those vanes, besides assuring that the boxes do not collide with each other, have the function of avoiding the unfolding of said boxes, by applying thereon a

downward pressure. The vanes are also mounted at the infeed of the second stacking area, with the same functions and characteristics.

In the first stacking area there are first pressing means and a first stop to retain the boxes being fed in, until the number of folded boxes is reached that form the first half of the package, so that when this is reached, the first stop tilts, and this first half package is pulled to the second stacking area, in which the formation of the second half of the package or stack has taken place simultaneously, there being in this stacking area another stop which in addition to retaining half of the package coming from the first stacking area, retains the other half of the package which is fed in superimposed on the first half of the package, the stop then swivelling and the pressing of the now complete package being carried out by means of a second pressing means located in this second stacking area, the operation of which is identical to that of the first pressing means of the first stacking area.

The two half packages, superimposed and stacked on each other, form a complete package which is pulled toward the exterior.

Maintaining this structure with the elements described, two possible embodiments of the stacking machine are envisaged in connection with different stacking and pulling means used in each stacking area, as well as taking into consideration the different pressing means used.

In a first embodiment it is envisaged that in the first stacking area there is a first conveyor belt on which the boxes are piled limited by the first stop, this conveyor belt transfers the first half package after the first stop tilts and with the help of first pressing means, toward the second stacking area. In the second stacking area there is a support lift which receives the boxes

coming from the upper conveyor belt, whilst at a lower level there is a second conveyor belt which receives the first half of the package. On this is deposited the second half of the package stacked on the support lift, and the complete package is pulled toward the exterior by means of the second conveyor belt with the help of a second pressing means.

The first and second pressing means incorporate some vanes, of adjustable angular position, to facilitate the infeed of the boxes into the stacking area and prevent the unfolding of the boxes, and they consist of a strap adjustable in height which collaborates in pulling the boxes stacked together with the first and second conveyor belts respectively.

In a second embodiment it is envisaged that instead of a conveyor belt in the first stacking area a first table lift is introduced on which the boxes are stacked limited by the first stop, this first table lift descends and comes to be introduced in a lower table which extends lengthwise until the second stacking area. The means of displacement of the first half package are constituted by some transfer fingers of cyclic operation which are displaced in a central slot defined in the lower table to push the first half package toward the second stacking area with the help of some first pressing means.

In this second stacking area a second table lift is also mounted which receives the boxes which are stacked forming the second half package, and on superimposing said table on the first half package, the complete package so formed is pushed, by means of the transfer fingers which traverse at the same time, a slot made in the second table lift and the slot defined in the lower table, directing the complete package toward the exterior of the machine. The pulling of the first half package or of the complete package is favoured with some first and second pressing means respectively, consisting in a structure supported by some articulated arms

which descends parallel to the lower table by pneumatic action and impinges by means of some wheels on the stack of boxes.

For the operation of the machine, a number of specific parameters have to be taken into account, such as the height of the box, the number of boxes per package, thickness of the cardboard and defining whether boxes or sheets are passing, so that starting from these parameters, the machine carries out the automatic adjustment movements, among which it is necessary to point out the adjustment of position of the stops corresponding to the first and second stacking area and the manual adjustment of the transverse position of the machine.

In addition to the aforesaid adjustments, it is necessary for the machine to reset all those mechanisms which have a cyclical movement to their start position, the machine then being ready to begin operation, establishing a synchronization between the infeed, namely the transformation or folding line of the boxes and the operating speed of the machine itself.

DESCRIPTION OF THE DRAWINGS

To complete the description that is being made and with the object of assisting in a better understanding of the characteristics of the invention, accompanying said description as an integral part thereof, is a set of drawings wherein, by way of illustration and not restrictively, the following has been represented: figures 1 to 10 which correspond to a first embodiment of the invention and figures 11 to 24 which correspond to a second embodiment of the invention.

Figure 1. - It shows a schematic representation of the stacking machine of the invention in an initial phase of working wherein the boxes are being fed into the first stacking area.

Figure 2. - It shows a following phase of working of the same machine represented in the previous figure.

Figure 3. - It also shows another view in schematic side elevation of the same machine, where it is now possible to see the stacking of boxes in the first area.

Figure 4. - It shows a view of the same machine, also in side elevation, with the first half of the package already formed in the first area and pressed by the pressing unit corresponding to the first stacking area, seeing also how the phase has now begun of the folded boxes being fed into the second stacking area, after tilting of the table foreseen at the entrance to the machine.

Figure 5. - It shows a schematic view like that of the previous figure, showing how the stacking of the second half package is formed in the second area of the machine.

Figure 6. - It shows a view in side elevation like that of the previous figures, in which the first half of the package obtained in the first stacking area has now passed to the second stacking area, being under the second half of the package of boxes stacked on the table lift of that second stacking area, located above the first half of the package.

Figure 7. - It shows a view like all the previous figures where the stacking can be seen of the two halves of packages superimposed on each

other forming the complete package, and likewise showing how the formation has already begun of the half package in the first stacking area.

Figure 8. - It shows a view like the previous figures, showing how the complete package forming in the second stacking area is transported toward the exit of the machine.

Figure 9. - It shows a view of the construction of the intermediate axle corresponding to one or another of the pressing units established both in the first and in the second stacking area of the machine.

Figure 10. - It shows, finally, a detail in both elevation and plan of the table lift foreseen in the second stacking area for the formation of the second half package of boxes.

Figures 11 to 14 show the input sequence and stacking of boxes in the first stacking area for a second embodiment of the invention in which it is seen how the boxes are being stacked on a first table lift.

Figures 15 to 17 correspond to stacking sequences ensuing upon those represented in the previously described figures, wherein the formation is observed of the second half package in the second stacking area.

Figure 18 shows the displacement of the first half package toward the second stacking area by means of a transfer finger.

Figures 19 to 21 show the descent of the second table lift of the second stacking area until impinging on the first half package, the infeed being shown also in figure 21 of boxes into the first stacking area to conform a new first half package.

Figures 22 to 24 show the sequence of pushing the complete package toward the exterior by means of the transfer fingers.

PREFERRED EMBODIMENT OF THE INVENTION

As can be seen in the aforesaid figures, the stacking machine of folded cardboard boxes or sheets comprises a general framework (1) formed by structures based on tubular sections fixed to each other, and fitted on their lower part with rollers (not shown) which allow the lateral displacement of the entire framework (1), with the object of aligning the machine as a whole with the centre of the sheets or cardboard boxes (2) which gain access to the interior of the machine coming from the corresponding folder.

Three well defined areas are established in said machine, an infeed area (3), a first stacking area (4) and a second stacking area (5), the infeed area (3) comprising a tilting table (6) formed by conveyor straps in which holes have been made for, by means of a fan, creating a vacuum effect which holds the glued cardboard boxes (2) on the tilting table (6) and allowing the pulling of the former from said infeed area (3) to the first stacking area (4). The movement of the conveyor straps which define the tilting table (6) is implemented by means of rollers, the former being connected to an arm the actuation of which is what establishes or produces the tilting of said table (6) to occupy the position represented in figures 1 and 2, or 11 to 13 wherein the folded boxes (2) are fed into to the first stacking area (4), or said tilting table (6) is positioned such that the folded boxes (2) are diverted, as is represented in figures 3 to 5 or 14 to 18, via an upper conveyor belt (8) toward a second stacking area (5), all this with the object that in the first stacking area (4) it is possible to form a first half package (20) of folded boxes and in the second stacking area (5) it is possible to form a

second half package (20') of folded boxes.

To facilitate the pulling of the folded boxes (2) and prevent the unfolding thereof during their infeed into the first stacking area (4) and into the second stacking area (5), the respective incorporation is envisaged of some infeed vanes (10-10') which rotate by means of a servo-motor to adjust their angular position with respect to some infeed axles (12-12').

It has been foreseen also that the stacking areas (4) and (5) incorporate a first pressing means (18, 31) and a second pressing means (18', 31') to facilitate the guided pulling of the first half package (20) and of the complete package (20") respectively, and also that they incorporate a first stop (9) and a second stop (9') which retain the boxes (2) during their stacking and tilt to facilitate their displacement once stacked.

Starting from this basic constitution, two possible embodiments of the stacking machine object of this invention can be distinguished:

First Embodiment

In the first stacking area there is a first conveyor belt (7) onto which the folded boxes (2) are fed according to that represented in figures 1 and 2, to form the first half package (20).

The folded boxes (2) impinge against the first stop (9) located in that first stacking area (4), so that as folded boxes (2) are fed in, the conveyor belt (7) gradually descends so that this first half package of boxes (20) is formed.

To facilitate the pulling of the boxes during their stacking on the conveyor

belt (7) the first and second pressing means (18-18') incorporate some tilting intermediate vanes (11-11') which also are superimposed on the folded boxes (2) preventing them from unfolding.

These intermediate vanes (11) are mounted on an axle (13) about which they tilt, which is formed, as is represented in figure 9, by an internal axle (14) and two end axles (15) external to the internal axle (14). The vertical position of the internal axle (14) is defined by the action of a servo-motor, not shown, which acts on some gear wheels (17) foreseen on the ends of the internal axle (14) in combination with individual rack rails (16). The end axles (15) define the position of the intermediate vanes (11), rotating likewise by means of a servo-motor.

Once the pre-established number of folded boxes (2) has been reached on the conveyor belt (7), the first pressing means (18) which comprise conveyor straps mounted between an axle (13) and a rear axle (19), tilt and press against that stack which forms the first half package of boxes (20), the first stop (9) being also able to tilt so that when the first half package (20) is formed the tilting takes place of the aforesaid first stop (9) and in turn the tilting of the first pressing means (18), as is represented in figure 4.

Simultaneously with the formation of that first half package (20), and the tilting of the first stop (9) and descent of the pressing means (18), the arm connected to the infeed table (6) tilts and causes the latter to be positioned so that the folded boxes (2) are fed to the upper conveyor belt (8), those boxes (2) travelling toward the second stacking area (5), in which a support lift (21) has been foreseen which receives the boxes (2) which are fed over the upper conveyor belt (8) to form the second half package (20') of boxes, as is represented in figure 6.

When the tilting table (6) is positioned so that the folded boxes (2) are fed toward the second stacking area (5), that is toward the support lift (21), the first conveyor belt (7) on which the first half package (20) of boxes is formed, has descended until being located at the same height as a second conveyor belt (22) located in the lower part of that second stacking area (5) toward which this first half package is led.

In the second stacking area are the infeed vanes (10') and some intermediate vanes (11') mounted on an axle (13'), with the same characteristics and functionality as the intermediate vanes (11) previously described. This axle (13') corresponds to the second pressing means (18') foreseen in that second stacking area (5), which has a rear axle (19'), on which a roller has been foreseen driven by means of a servo-motor.

The rear axle (19) of the first pressing means (18) rotates when the straps of the first conveyor belt (7) are moved, since they are joined mechanically with the same belt, so that when the straps of the first conveyor belt (7) advance, the straps of the first pressing means (18) also advance in the same direction.

The rear axle (19) is moved by means of a strap, while the axle (19') is moved by a motor which rotates in synchronism with the straps of the second conveyor belt (22). The remaining components which constitute the first and second pressing means (18) and (18') and their functionality are the same.

In this second stacking area (5) is the second stop (9') of greater length than the first stop (9') of the first stacking area (4), since said second stop (9') is foreseen to retain not only the second half package of boxes (20') which have to be formed in that second stacking area (5), but also the first

half package (20) which was formed in the first stacking area (4) and reaches the second conveyor belt (22), pulled by the conveyor belt (7), until impinging on the aforementioned second stop (9').

The boxes (2) which are fed to that second stacking area (5), are deposited on the support lift (21), acting in that stacking the vanes (10') and (11'), and subsequently the pressing means (18') in the same way as in the previous case, so that when the second half package (20') reaches a pre-established number of boxes on the table lift (21), some pneumatic and fixed cylinders (23) foreseen on the front part and other pneumatic cylinders (24) foreseen on the rear part and fixed to the second stop (9') act so that the second half package (20') falls on the first half package (20) which had already been introduced and located on the second conveyor belt (22), the complete package (20") being formed as is represented in figure 7, the latter being pulled toward the exterior by means of the second conveyor belt (22), as is represented in figures 7 and 8.

When the second pressing means (18') of the second stacking area (5) descends, and the support lift (21) arrives at the lowest point of its travel, the aforementioned pneumatic cylinders (23) and (24) close, releasing the second half package (20') which falls on the first package (20) to form the complete package (20"), the second stop (9') subsequently tilting so that the second conveyor belt (22) can proceed to pull and transport the complete package (20") toward the exit of the machine.

Straps run between the axles (13-19) and (13'-19') of the pressing means (18-18') and the axles (13) or (13') are moved together with the corresponding stop (9) or (9').

The pressing means (18) or (18') are moved forward or backward, in accordance with the stop (9) or (9'), with the particularity that the forward motion of each pressing unit (18) or (18') is carried out with a ratio of 2/1 with respect to the respective stop (9) or (9'), which is possible because the pressing means (18) or (18') are fastened at their two ends to the same guide as the stop (9) or (9') and their horizontal position depends on the gearing and on the sheaves which rotate when the sheave of the stop (9) or (9') rotates.

Thus, whilst the stop (9) or (9') advances, for example, 100 mm, the corresponding pressing unit (18) (18') moves 50 mm, so that the axle (13) or (13') is always located on the central part of each folded box (2) which comes onto the corresponding stacking area.

It has to be pointed out that the drives of the axles (13-13') of the pressing means (18) and (18'), as well as of the conveyor belts (7) and (22), of the pulling straps of the tilting table (6) and of the upper conveyor belt (8) are implemented by means of motors with frequency variator.

The operation of the machine begins with the loading of data from a robot or from a touch screen operating panel, the following parameters being required to render it operable:

- Box width.
- Sheet height.
- Number of boxes per package.
- Thickness of the cardboard.
- Defining whether boxes or sheets are to pass.

Starting from these parameters, the machine carries out the necessary adjustment movements which are, adjustment of position of the stops (9) and (9'), as well as adjustment of transversal position of the support lift (21) and adjustment in position height-wise of the second conveyor belt (22), all these adjusting movements being automatic, it being necessary to carry out manually the adjustment in transversal position of the machine itself.

In addition to the aforementioned adjustments, it is also necessary to set all those mechanisms that have a cyclical movement to their initial position.

When the adjustments have been carried out and all the mechanisms set to the initial positions of the cycle, the operating order can be given, so that all the movements will be carried out in a synchronized manner to obtain firstly the first half package (20) and subsequently the second half package (20'), the two being joined to each other thereafter and finally transported by the second conveyor belt (22) toward the exit.

The boxes (2) which have access to the infeed area (3), and find the tilting table (6) in the low position, pass to the first stacking area (4), which infeed is carried out after the upward tilting of the vanes (10) and (11), this second having a delay with respect to the first, so that on completing the infeed the box goes down simultaneously on those two vanes, pushing said box downward and leaving the space free for the infeeding of the following box, the cycle being repeated every time that a box enters. When the first box is fed in, the first conveyor belt (7) begins to descend at constant speed, the speed of descent being a function of the speed of the machine and the thickness of the cardboard which constitutes the box (2), taking into account whether it is a box or a sheet. That first conveyor belt (7) will descend until

the first half package (20) is complete.

Moreover, every time that a box enters and is detected, the descent movement will be confirmed, and if the following box is not detected in a period greater than one cycle, the first conveyor belt (7) will be stopped and will not move until the infeed of the following box is detected.

The formation of the first half package (20) in the first stacking area (4) is carried out in the manner already described, so that when that first half package (20) is complete, the first pressing means (18) descend and at the same time, and by means of the corresponding actuation cylinders the first stop (9) is made to tilt, and during that time they are used to align the final boxes (2). Also the height of the first conveyor belt (7) is adjusted and of the first pressing means (18) to be made equal to the second conveyor belt (22).

With the first half package prepared in the manner described, the conveyor belts (7) and (22) are started in order to pass said first half package (20) to the second conveyor belt (22), until it impinges on the second stop (9'). The motor that drives the first conveyor belt (7) also drives, by means of a belt transmission, the corresponding straps of the first pressing means (18), holding and pulling the first half package (20) from above.

On concluding the pulling process the upward tilting is performed of the first pressing means (18), and of the first conveyor belt (7), and the downward tilting is carried out of the first stop (9), leaving that first stacking area (4) ready to receive the boxes (2) of the following cycle.

That same process is carried out in a similar way in the second stacking area (5), with the difference that in this case the boxes (2) are deposited on a support lift (21) formed by four supports which emerge or retract laterally and allow the second half package (20') to be sustained or let fall on the first half package (20), so that once the second half package (20') is on the first half package (20), forming the complete package (20"), the latter is extracted by means of the second conveyor belt (22) and the straps of the second pressing means (18') to the exit from the machine.

Subsequently, when the second conveyor belt (22) and the second pressing means (18') are stopped, the latter begins to rise and also the support lift (21) rises, the four supports of said table being opened and the cylinders which act on the second stop (9') being opened. At the end of these movements, the second stacking area (5) is ready to receive boxes, as well as the first half package (20) of the following cycle.

As it will have been possible to ascertain, all the movements of the box cycle and of the package cycle, are stopped whenever boxes cease to enter in mid-cycle, the process being repeated every time that the package cycle is completed, until completing the order or stopping insertion.

In the event of the job order ending without completing a package, the machine would remain in standby, in which case one would act on an incomplete cycle button on the operating panel and the cycle would end with the boxes that there were at that moment, so that if the first half package had not been completed, this would be extracted directly to the exit. However, if it is the second package that remains to be finished, the first half package would be waiting under the second half package, the latter being appended with the boxes that it had at that moment and the incomplete package would be extracted, the machine returning to the position for beginning of the cycle,

so that in that position it is possible to recommence the cycle or carry out the total shutdown of the machine.

The machine will be completed with means for detecting jamming, such as an infeed detector, an infeed detector to the first stacking area, an infeed detector to the second stacking area, a detector at the output from the infeed area, etc., the detectors working so that they have the time corresponding to a box cycle, from in each of them the infeed of the box is detected until the exit of the box is detected. Likewise it will have exit detectors of the first half package and exit detectors of the final package, having the time corresponding to a package cycle to detect the exit thereof and allow the step for the formation of the following package.

In the event of a jam occurring, identified by one of the detectors, the location where it has taken place will be shown on a screen and, depending thereon, it will be possible to take the necessary steps to clear the blockage and put the machine into operation again.

Second Embodiment

In the first stacking area (4) it has been foreseen that the stacking machine incorporates a first table lift (32) instead of the first conveyor belt (7) on which the folded boxes (2) will be stacked coming from the tilting table (6) being retained by the first stop (9). Said first table lift (32) descends progressively as the boxes are stacked until being introduced into a lower table (33) which extends the length of this first stacking area (4) and of the second stacking area (5), said first table lift (32) and lower table (33) having a longitudinal slot for the passage of some transfer fingers (34), which push the first half package (20) formed on the lower table (33), when the first stop (9) has been turned upward, toward the second stacking area (5) in

collaboration with the first pressing means (31) which maintain the first half package (20) pressed against the lower table (33) during the displacement thereof.

The first half package (20) is displaced by the push of the transfer fingers (34) toward the second stacking area (5) until it impinges against the second stop (9').

In the second stacking area (5) a second table lift (30) has been foreseen on which the folded boxes (2) are stacked coming from the upper conveyor belt (8) being retained by the second stop (9'). The second table lift (30) descends progressively in height as the boxes (2) are stacked on top until impinging on the first half package (20) which is standing on the lower table (33) coming from the first stacking area (4).

Then the assembly formed by the first half package (20) and the second half package (20') is pushed by means of the transfer fingers (34) which traverse a slot defined in the second table lift (30) at the same time as they traverse the slot of the lower table (33). The first half package (20) and the second half package (20') are pushed by said drawing means (34) to form the complete package (20") which is transferred toward the exterior with the help of the second pressing means (31').

The transfer fingers (34) are mounted on a chain which follows a cyclic path around the lower table (33).

The first and second pressing means (31-31') consist of individual structures formed from sections supported by some articulated arms (34-34') actuated by a pneumatic system which define the movement of the structure in parallel with respect to the lower table (22), it being foreseen that the

lateral sections of the structure incorporate in their base some idler contact wheels which impinge on the first half package (20) or on the complete package (20") respectively.

The lower table (33) is formed by support sections which have idler wheels on which the stacked boxes rest to facilitate their transfer.